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# **IMPROVED INSENSITIVE MUNITIONS PERFORMANCE OF AN HE ROCKET WARHEAD**

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## *Problem:*

Current HE warheads pose a serious safety risk onboard ship when exposed to IM threats

## *Objective:*

Improve the Insensitive Munitions (IM) performance of a COMP B loaded 2.75-Inch High Explosive warhead.

## 2.75-INCH ROCKET SYSTEM DESCRIPTION



### 2.75-INCH ROCKET SYSTEM FAMILY

NAVY & MARINE CORPS LAUNCHERS:  
LAU-68D/A (7-TUBES) & LAU-61C/A (19-TUBES)

ARMY LAUNCHERS  
(HELICOPTERS ONLY):  
M260 (7-TUBES) & M261 (19-TUBES)

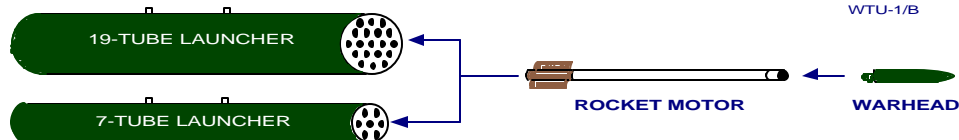
AIR FORCE LAUNCHER:  
LAU-131A (7-TUBE)

NAVY & MARINE CORPS  
ROCKET MOTORS  
MK 66 MODS 2 & 4

ARMY ROCKET MOTORS  
MK 66 MODS 1, 3 & 4

AIR FORCE ROCKET MOTORS  
MK 66 MODS 2 & 4

WARHEADS  
M151  
M229  
MK 67  
M257  
WDU-4A/A  
M261  
M278  
M259  
M156  
WTU-1/B





- **CURRENT M229 WARHEAD**
  - Contains 4.8 lbs COMP B4 explosive
  - Cast iron nose and steel base identical to M151 HE warhead, separated by a 10” cast iron cylindrical body (brazed)
  - Uses M423 or M427 point detonating fuze with RDX lead-in and booster charge





## CURRENT COMP B PERFORMANCE (IN M151 WARHEAD)

	COMP B FILL
FAST COOK-OFF	PARTIAL DET.
SLOW COOK-OFF	DETONATION
BULLET IMPACT	DEFLAGRATION
FRAGMENT IMPACT	DETONATION
SYMP. DETONATION	DETONATION

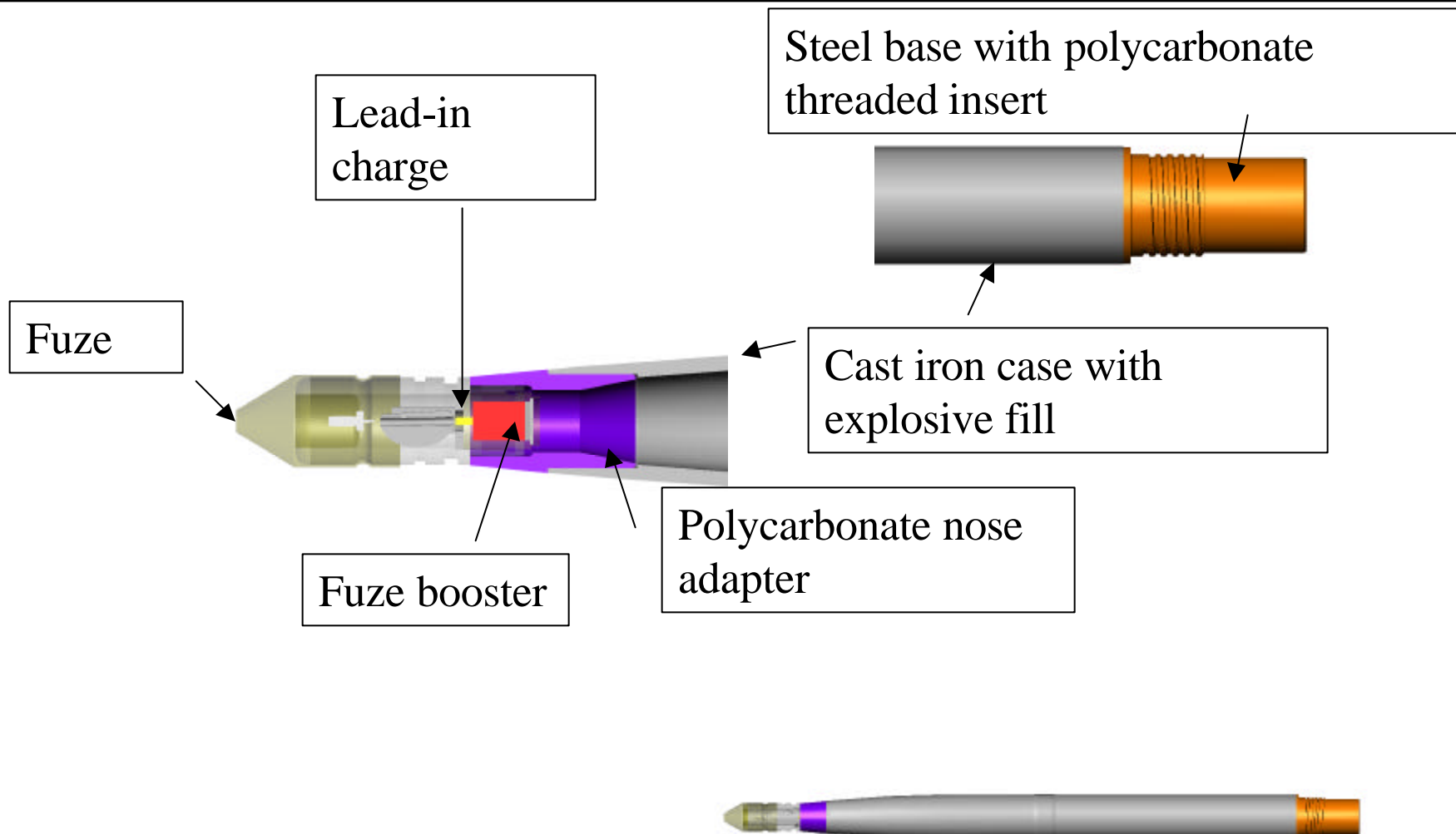
## IMPROVED M229 HE WARHEAD

### •PROPOSED DESIGN

- PBXN-110 or PBXN-107 explosive main fill
- PBXN-5 lead-in charge
- PBXN-7 booster charge
- Venting on both ends

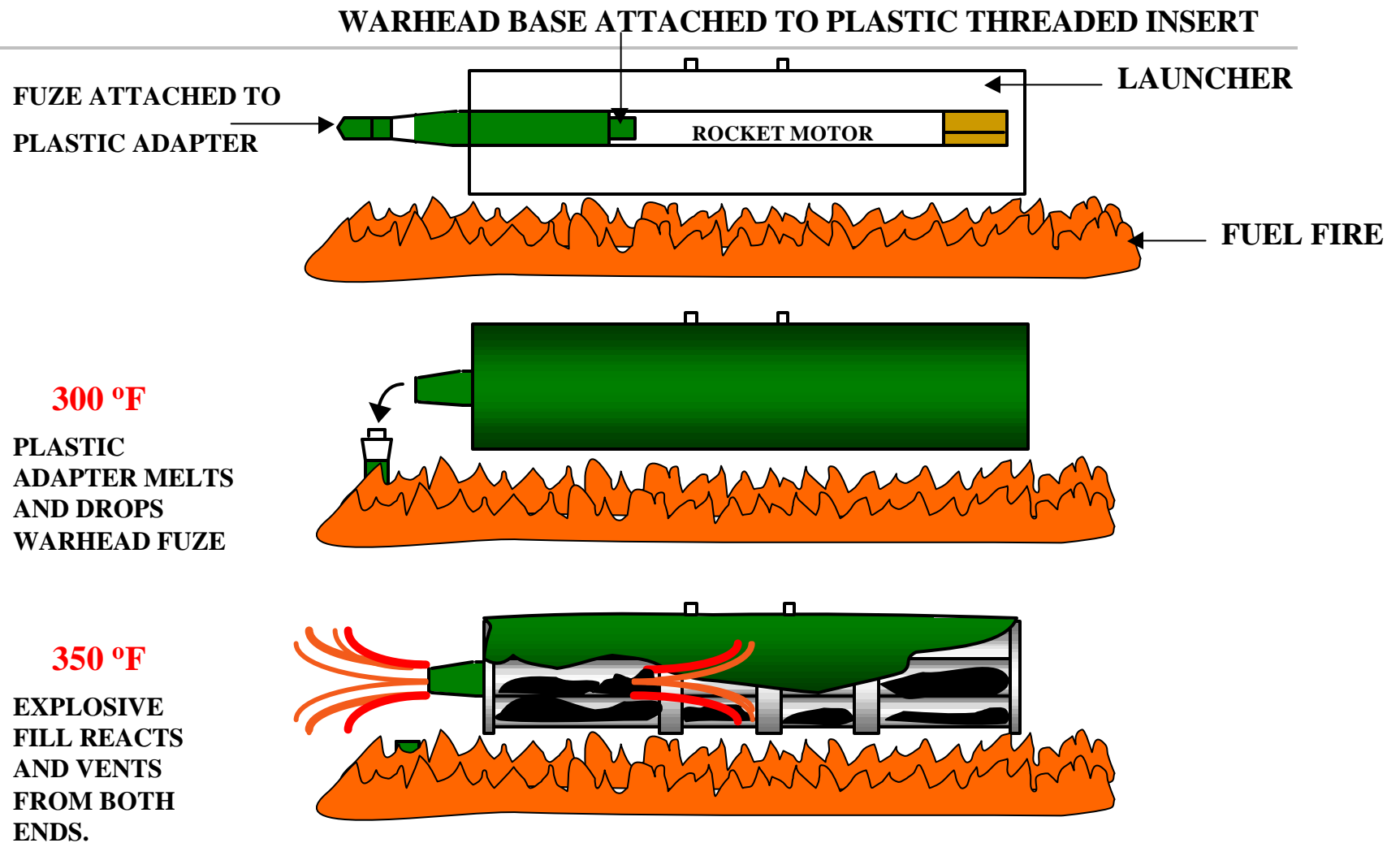


## IMPROVED M229 HE WARHEAD





## IMPROVED M229 HE WARHEAD THEORETICAL FCO REACTION





## IMPROVED M229 HE WARHEAD

### IM TEST RESULTS

	COMP B FILL	PBXN-110 FILL	PBXN-107 FILL
FAST COOK-OFF	PARTIAL DET.	BURN	EXPLOSION
SLOW COOK-OFF	DETONATION	BURN	DEFLAGRATION
BULLET IMPACT	DEFLAGRATION	BURN	BURN
FRAGMENT IMPACT	DETONATION	DETONATION	DETONATION
SYMP. DETONATION	DETONATION	NOT TESTED	NOT TESTED

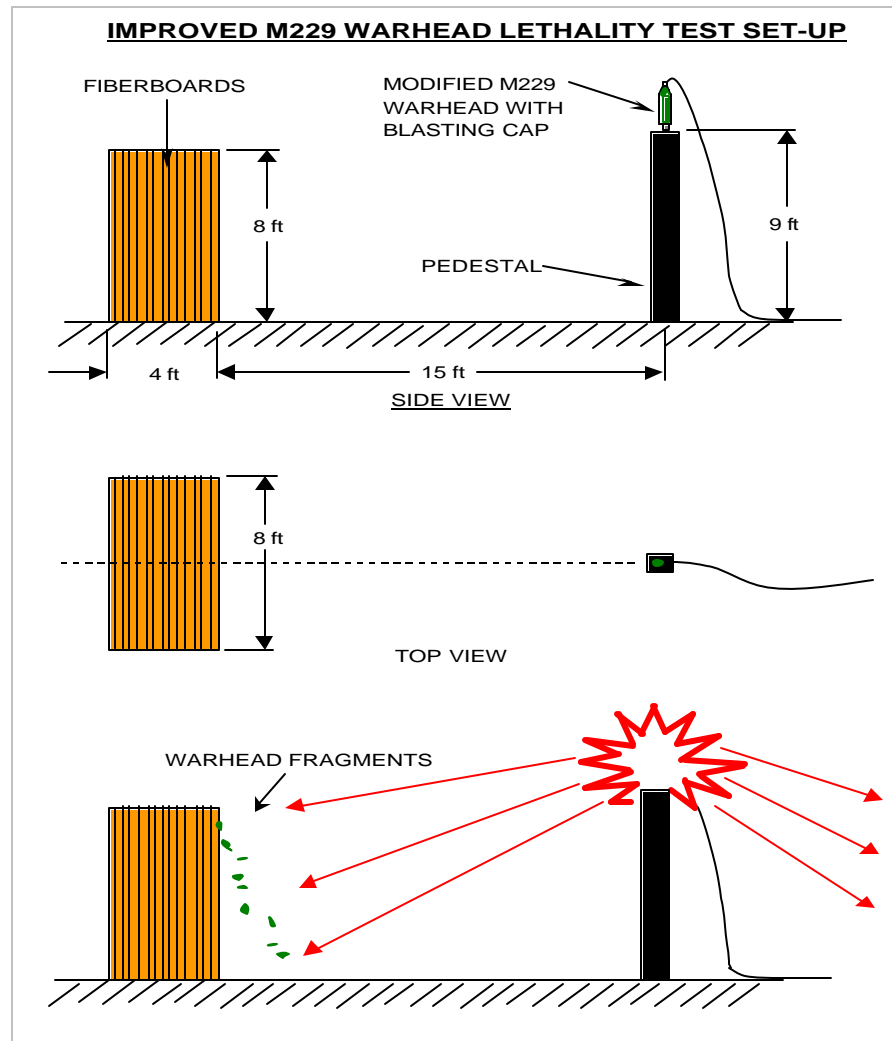
## IMPROVED M229 HE WARHEAD

- Slow Cook-Off Results
- PBXN-110 loaded warhead



## IMPROVED M229 HE WARHEAD DESIGN EVALUATION TESTING

- Nose-initiated, fragment pattern shifted towards tail
- Both PBXN-110 & PBXN-107 filled warheads resulted in a smaller fragment average at higher velocities than COMP B
- Determining Probability of Kill values



## *Conclusion:*

- IM improvements were successful
- PBXN-110 performed better than PBXN-107 in IM tests
- Design demonstrated sufficient IM improvement to warrant continuation of program